SBC LEC
TECHNICAL PUBLICATION

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[END OF SECTION]

6.1.15 The use of legacy miscellaneous fuse bays shall be discontinued as bay mounted fuse panels shall be the source of secondary distribution.

6.1.16 SPDUs shall be fused at their source (BDFB, Power Board) with a fuse size not to exceed the maximum rating of the fuse panel.

6.1.17 Every SPDU shall be fed individually from the power source (either from a BDFB, distribution panel or intermediate PDU) using a single fuse and set of power cables per load. Fuse panels shall not be "daisy chained" to the same source (sharing the same cable or fuse).

6.1.18 SPDUs may serve network elements outside the bay in which the fuse panel resides as long as it is within a close proximity of the fuse panel, and does not exceed the engineered limitation of the largest output cable the panel can accommodate. Exact distances will vary from panel to panel and overall shall not be outside of line-of-sight. Distances shall be calculated by determining the largest conductor physically attachable to the panel (tapping a larger cable to increase the distance is not acceptable), appropriate voltage drop, and List 2 DC amperage value to be used per fuse position.

6.2. Telecommunications Equipment Loads

6.2.1 The nominal voltage levels for standard telecommunications equipment are -48V. Although nominal voltages are standardized, the limits permitted on individual equipment assemblies are more variable. Voltage requirements are:

a) HIGH VOLTAGE LIMIT - Above this supply voltage, equipment damage may occur.

b) LOW VOLTAGE LIMIT - Below this supply voltage, equipment does not operate properly.

c) ELECTRONIC NOISE IMMUNITY - The power supply shall not exceed manufacturer's requirements and in no case exceed 35 dBrnC.

6.2.2 The maximum allowable one way voltage drop from batteries to the served equipment via a BDFB/SPDU shall be 1.0 volt per reference drawing SBC-P-05410-E .

6.2.3 The DESP shall assure that the maximum allowable voltage drop from the battery to the served equipment is not exceeded. This voltage drop is an engineered value, based on the minimum volts per cell (MVPC) used in calculating battery requirements. Refer to the BDFB CO records in TAB/db & PowerPro for the engineered voltage drop values of each BDFB.

6.3. Protector And Cable Sizing

6.3.1 Overcurrent protection (fuses or circuit breakers) and secondary distribution cables are sized using List 2 current drain. List 2 current drain represents the peak current for a circuit under worst-case operating conditions. Worst case could be a constant power load requiring maximum current at minimum operating voltage.

6.3.2 The DESP shall determine the cable path and length, and then size the cable for the load at the maximum allowable voltage drop. The following formula applies:

$$CM = (11.1 \times L \times Feet) / V$$

Where:

CM = Circular Mil area of the cable

L = List 2 Drain
Feet = One-way length of cable in feet
V = Allowable voltage drop one way

See reference drawing SBC-P-05410-E.

6.3.3 The preferred engineering method of power connection is to use a non-interrupted conductor with connecting lugs at each end. Transitional devices shall only be used when no other solutions (such as narrow tongue lugs) are applicable.

6.3.4 The DESP shall engineer wiring connections to BDFB fuse posts to be ≤ 1/0 (based on circuit ampacity, voltage drop requirements and connection accessibility); however, on legacy fuse panels in primary and secondary distribution bays, fuse post stiffeners shall be required for 1/0 connections.

6.3.5 Cables larger than #1/0 shall not be engineered into the interior of the BDFBs or secondary power distribution frames.

a) For external return bar BDFBs, the return lead shall be engineered to be terminated without a reduction.

6.3.6 Fuse size shall be larger than the load on the cable. Multiply the List 2 load by 1.25 (125%) to determine the correct protector size. **Caution:** This does not apply to protectors at BDFB or Power Board which supply miscellaneous fuse panels as described previously under Power Distribution Sources. Once the protector is sized, assure the ampacity of the cable exceeds the rating of the protector. The cable size may be increased as necessary to meet the requirements for ampacity. The current capacity of the cable is usually only an issue with very short runs, since cables are sized first on voltage drop, then current capacity.

6.3.7 When adding circuit breakers to an existing PDU, the circuit breaker shall be, thermal-magnetic and 100% DC rated, UL listed, and the trip-free type. Contacts shall not be able to be held closed during an over-current condition, by holding the lever in the closed position.

6.3.8 A circuit breaker with a 100% rating can be loaded to the List 2 drain.

6.3.9 Circuit breakers not rated at 100% shall be larger than the load on the cable. Multiply the List 2 load by 1.25 (125%) to determine the minimum protector size.

6.3.10 Primary and secondary circuit protection devices shall be coordinated to prevent premature operation of primary fuses caused by faults on secondary circuits. The differential shall be approximately 20% per protection level.

6.3.11 Circuit breakers shall not be protected by fuses as circuit breakers typically have slower interrupt ratings. The exceptions are:

a) If the network element rack comes pre-assembled;

b) Where the circuit breaker is used as an on/off switch at the equipment

6.3.12 If paralleling of conductors or reinforcement of existing, overloaded conductors is required, they shall be electrically joined at both ends to form a single conductor. Paralleled conductors shall meet the following:

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a) Be the same length;

b) Have the same conductor material;

c) Be the same size in circular mils area;

d) Have the same insulation type;

e) Be terminated in the same manner and area;

f) Follow the same path.

6.3.13 All cartridge type fuses shall be DC rated, telecommunications power-style (e.g. TELPOWER®) for new installations and replacements, unless another type of fuse is specified in the applicable SBC Equipment or Power Drawing. Approved telecommunications power-style fuses are listed on the Minor Materials List and shall be used

6.3.14 All non-cartridge type fuses and circuit breakers shall be AC rated for AC circuits and DC rated for DC circuits.

6.3.15 Renewable link and H type fuses shall not be used.

6.3.16 Alarm pilot fuse applications other than the 0.18 amp GMT for Telpower fuse Blocks shall be 1/2 amp. (35 or 70 type).

6.3.17 All DC fuses shall be provided with a blown fuse indicator connected to an alarm circuit and indicating lamp within the bay.

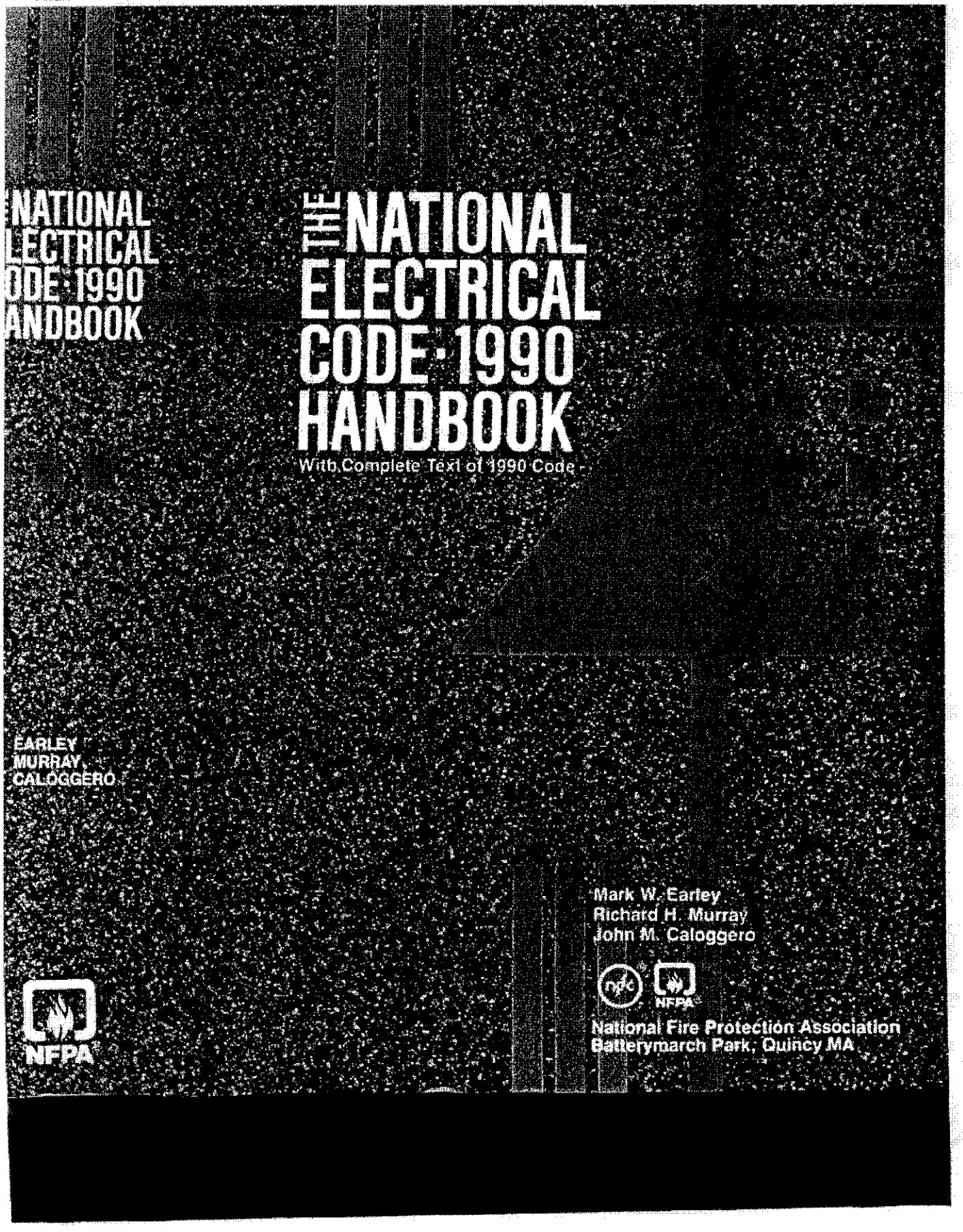
6.3.18 All telecommunications power-style (e.g. TELPOWER®) fuse blocks equipped with a GMT alarm fuse circuit shall be equipped with a 0.18 amp fuse.

6.3.19 Dummy fuses shall be provided at all exposed, vacant fuse positions. (This includes GMT type and 70 type). It is not necessary to provide dummy fuses for enclosed cartridge type fuse blocks.

6.3.20 The DESP shall ensure that the correct type and quantity of fuse designation pins are provided for those fuse panels designed to accommodate fuse designation pins.

6.3.21 The DESP shall provide 10% spare fuses (minimum 1) of each size and type ordered up to 100 amps, and 25% spare fuses (minimum 1) of each size and type from 100 to 600 amps.

6.3.22 Only manufacturer approved fuse reducers may be used for exposed face fuse positions. In all other cases fuse reducers shall not be used.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BRANCH-CIRCUIT AND FEEDER CALCULATIONS—ARTICLE 220

There is no restriction placed on the number of outlets connected to a general lighting or small appliance branch circuit. The number of receptacle outlets in a room is determined by Section 210-52(a). It is desirable to provide more than the minimum number of receptacle outlets required, thereby further reducing the need for use of extension cords.

Consideration must be given to balancing the loads when terminating circuits in panelboards.

B. Feeders

220-10. General.

(a) Ampacity and Computed Loads. Feeder conductors shall have sufficient ampacity to supply the load served. In no case shall the computed load of a feeder be less than the sum of the loads on the branch circuits supplied as determined by Part A of this article after any applicable demand factors permitted by Parts B, C, or D have been applied.

See Figure 220-7.

(FPN): See Examples 1 through 8, Chapter 9. See Section 210-22(b) for maximum load in amperes permitted for lighting units operating at less than 100 percent power factor.

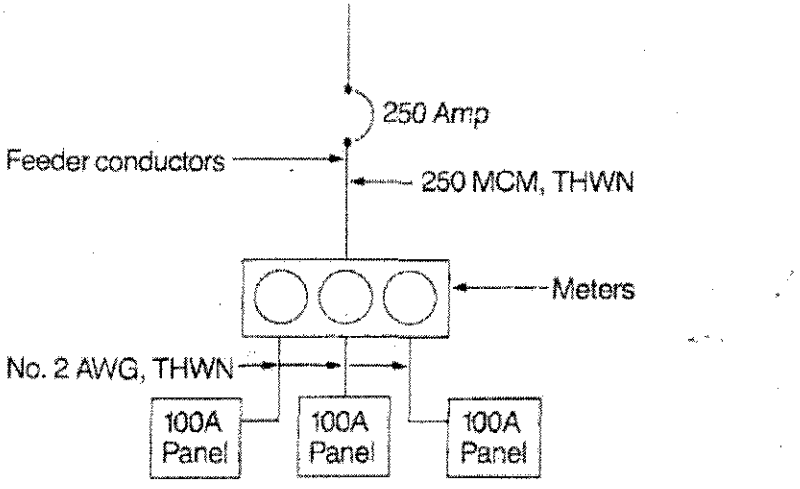

Figure 220-7. Each panel serves an 80-A load. The feeder size is based on the sum of the computed and connected loads served by each panel, not on the sum of the panel or overcurrent device rating.

(b) Continuous and Noncontinuous Loads. Where a feeder supplies continuous loads or any combination of continuous and noncontinuous loads, the rating of the overcurrent device shall not be less than the noncontinuous load plus 125 percent of the continuous load.

This section has been revised for the 1990 *Code*. It requires the overcurrent device for a feeder to be sized at not less than the sum of the combination of the noncontinuous loads plus 125 percent of the continuous loads.

The ungrounded service conductors are no longer required to be sized at this value. Service conductors are required to have sufficient ampacity to carry the loads computed in accordance with Article 220, with appropriate demand factors applied.

See Sections 230-23, 230-31, and 230-42.

Exception: Where the assembly including the overcurrent devices protecting the feeder(s) are listed for operation at 100 percent of their rating, neither the ampere rating of the overcurrent device nor the ampacity of the feeder conductors shall be less than the sum of the continuous load plus the noncontinuous load.